EUCLIDEAN AND HYPERBOLIC MULTISCALE SUBSTITUTION TILINGS

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Substitution rules provide a classical method for constructing aperiodic tilings via a substitution-inflation procedure. When distinct incommensurable scales are allowed in the substitution rule a different approach is required, and new geometric objects emerge. In my talk I will introduce multiscale substitution tilings and their hyperbolic liftings into the upper-half space H^{d+1}, which may be viewed as extensions of constructions previously considered by Penrose, Kakutani and Kamae, among others, and essentially illustrated by Escher. I will then describe recent results about such tilings and about the geodesic and horospheric actions on the associated tiling spaces, including a prime orbit theorem for the geodesic flow. Based on joint work with Yaar Solomon.